Epitomes

Important Advances in Clinical Medicine

Urology

The Scientific Board of the California Medical Association presents the following inventory of items of progress in urology. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist busy practitioners, students, research workers or scholars to stay abreast of these items of progress in urology that have recently achieved a substantial degree of authoritative acceptance, whether in their own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Urology of the California Medical Association and the summaries were prepared under its direction.

Reprint requests to Division of Scientific and Educational Activities, California Medical Association, PO Box 7690, San Francisco, CA 94120-7690

New Developments in Diagnosing and Treating Erectile Impotence

THE UNDERSTANDING of erectile physiology and the treatment of erectile dysfunction continue to be dynamically expanding areas of urologic knowledge.

With a better understanding of the physiology and more sophisticated testing techniques, it has been determined that in 85% of men with impairment for more than a year, there is an organic origin (as opposed to 90% a psychological one, as believed historically).

Organic impotence is due to "failure to initiate" (neurogenic), "failure to fill" (arteriogenic) or "failure to store" (corporal venous leakage). Diagnostic tests are directed toward identifying which of these is the origin so that the most desirable therapy can be selected.

Failure to initiate (neurogenic cause) is generally nonreversible, though the lack of neurologic initiation can be overridden by direct intracorporal pharmacologic stimulation (papaverine hydrochloride and phentolamine mesylate).

Intracorporal pharmacologic stimulation can also be successful in cases of "failure to fill" (atherosclerotic occlusive disease) because the long duration of the stimulus results in filling even with diminished flow. It can also be successful with "failure to store" because the stimulus creates enough flow and tumescence to reduce the venous leak.

Failures to fill and to store are both amenable to a reconstructive vascular operation, which has received a great deal of attention as the procedures—arterial revascularization and venous leak ligation—have shown increased success.

Patients with venous leak or "failure to store" present an especially interesting problem. They most often have had trauma, atherosclerotic occlusive disease or Peyronie's disease. To establish the diagnosis, a new test—dynamic infusion cavernosometry and cavernosography—was developed. Constant penile infusion is done during pharmacologically induced (papaverine and phentolamine) tumescence that should approximate the physiologic state of maximal corporovenous occlusion. If the corporal body pressure falls by more than 30 mm of mercury in 30 seconds (from a beginning pressure of more than 150 mm of mercury), it is diagnostic of a venous leak. The location of the leak is then identified radiographically by intracorporal infusion of dilute radiopaque contrast solution so that the most appropriate surgical procedure can be selected. The procedures of venous ligation, reduction cavernoplasty or dorsal vein arterialization (Virag V operation) have about 60% success in restoring normal erections.

For those whose erectile function cannot be satisfactorily restored using nonoperative means, a reconstructive vascular operation offers an alternative to penile prosthesis, particularly for those patients who are concerned emotionally about the idea of an "artificial erection" produced by a prosthesis.

HARIN PADMA-NATHAN, MD
Boston

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The Continent Urinary Diversion

THE SEARCH FOR A satisfactory urinary diversion has intrigued and plagued urologists for more than a century. Ideally such a diversion should duplicate the function of the bladder in being able to effectively collect and store urine without an external appliance, permit emptying under voluntary control, preserve renal function and maintain an optimal quality of life.

The most popular urinary diversion has been the refluxing ileal conduit, which requires an external collecting appliance. For many years the search has continued for a more desirable diversion. Not only do patients with ileal conduits have a high frequency of late complications (chronic pyelonephritis, stones and renal failure) from long-standing reflux, but the psychosocial stigma associated with wearing an appliance can have a pronounced impact on body image and may even deter patients from undergoing a needed radical cystectomy.

Over the past decade there has been heightened interest in forms of diversion that prevent reflux and are continent so that the external appliance is eliminated. The success of these diversions has improved with the development of techniques to transform bowel segments into urinary reservoirs and the creation of functioning urinary sphincters. Various diversion techniques have evolved worldwide, differing by the type of

reservoir used, the method of antireflux protection and the continence mechanism. Such names as Kock, Camey, Mainz and Mitrofanoff have been used to identify some of the more commonly done procedures.

The Kock pouch is the most desirable continent diversion because the pressure within the created reservoir remains extremely low, even with volumes of as much as 1,000 ml, and there are no pressure spikes from bowel smooth muscle contraction (a frequent cause of incontinence in other types of continent diversions). Intussuscepted small bowel afferent and efferent one-way nipple valves prevent urine reflux to the kidneys and urine leaking from the pouch. If these valves are not competent, revision may be necessary, though revision rates are decreasing as technical innovations are perfected.

For those patients whose general condition and prognosis permit them to consider the aesthetic and body image advantages of a continent urinary diversion, the Kock pouch appears to be an attractive alternative.

STUART D. BOYD, MD
Los Angeles

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Ureterorenoscopy

TRANSURETHRAL ENDOSCOPY of the upper urinary tract has become a routine part of most urologic practices. The technical advances of increasingly smaller rigid and flexible endoscopes with high-resolution lenses and channels sufficient for irrigation and the passage of diagnostic and therapeutic instruments have opened the door of nonincisional access to the upper urinary tract. It is obvious that the therapeutic options offered by direct visualization have had the greatest clinical impact. The options include stone extraction, catheter or stent passage and removal of foreign bodies.

Rigid transurethral ureteroscopy is done with instruments varying between 8.5 and 12.5 French. Following dilation of the ureterovesical junction, the ureteroscope is passed through the ureteral orifice and up the ureter under direct vision to the point of interest. Success rates for passage are above 95%, with failures due to anatomic limitations (ureteral angulation or fixation). The successful extraction of ureteral stones has improved dramatically. Initially only 60% of stones could be removed ureteroscopically, but now stones in the lower ureter can be removed in more than 90% of patients, and those in the upper ureter can be considered for removal. Ureteroscopic stone extraction or disintegration complements other forms of nonsurgical stone removal. Stones below the rim of the bony pelvis cannot routinely be treated with current extracorporeal shock-wave lithotriptors or percutaneous methods. But this region, the most common site for ureteral stones to lodge, is ideally located for ureteroscopic access. When a stone is large or resists extraction, transureteroscopic lithotripsy (stone fragmentation) by ultrasonic electrohydraulic or pulsed-dye laser can be done.

Flexible ureteroscopes, available for 25 years, have finally been perfected to a clinically useful state. Those that are not actively deflectable simply follow the ureter and thus are useful more for diagnostic than therapeutic indications. The deflectable flexible ureteroscope just now becoming commercially available promises more frequently successful access to the upper urinary tract and the ability to visualize and obtain a biopsy of peripheral collecting system lesions and extract or disintegrate calyceal stones. Significant complication rates for those with experience have decreased to about 4% with less than 1% of those cases requiring an open surgical procedure. As with any new technique, a learning curve exists, and complication rates will diminish and success rates increase as a surgeon gains experience.

Transurethral ureteroscopic procedures (diagnostic and therapeutic) have become standard clinical practice and have saved many patients the morbidity of open surgical procedures to accomplish the same goal.

JEFFRY L. HUFFMAN, MD
Los Angeles

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Integrated Management of Urinary Stone Disease

THE SIMPLICITY, efficacy and relative lack of morbidity of extracorporeal shock-wave lithotripsy (ESWL) in destroying kidney and ureteral stones have revolutionized "surgical" treatment methods since it was first introduced in 1980. Urologists now simply place patients in the treatment machine, aim the shock wave via the sighting cross hairs and destroy the stone in less than 50 minutes. Efficacy? More than 80% of patients are stone-free within three months, and fewer than 30% have any significant pain while passing the fragments. Perirenal hematoma, the worst complication noted to date, occurs in 1 of every 400 patients. There are very few other complications of significance. Hence, it is clear that ESWL functions remarkably well.

The success of this procedure and other relatively noninvasive stone-removal techniques (percutaneous nephrostolithotomy and transurethral ureteroscopic lithotripsy) have permitted the elimination of most stones without an open surgical procedure.

Each of these procedures has specific areas of strength where its use is preferable. ESWL is most effective for renal stones, but can be used for ureteral stones above the sacroiliac joint if there is enough fluid around them to transmit the shock wave and permit fragmentation, or if they can be pushed back up into the kidney for disintegration. Percutaneous nephrostolithotomy is used to debulk staghorn stones, to remove those poorly fragmented by ESWL because of hardness (cystine) and to eliminate stones in poorly draining calyces (dependent, or with narrow infundibulae). Transurethral ureteroscopic lithotripsy is addressed in another of this series of epitomes.

Does this mean we need not worry about preventing renal stone disease? Hardly! Even with these new treatment methods, there can be renal compromise from the stone, from the treatment or from complications of either, and it is certain that a kidney will occasionally be irrevocably damaged.

In view of this, it is important that we prevent recurrences whenever possible. Nearly 80% of patients with stones have a definite metabolic abnormality that can be identified and treated. Diseases such as hyperabsorption or renal leak hypercalciuria, hypomagnesiumuria, hypocitruria and so forth re-